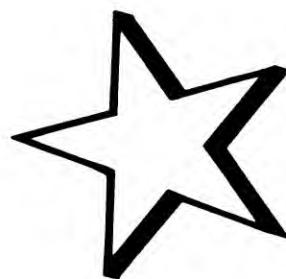


GAME 1048

Bally

HOKUS
ROKUS



Bally

MANUFACTURING CORPORATION

2640 Belmont Avenue • Chicago, Illinois, 60618, U.S.A.

TELEPHONE (312) 267-6060/TELEX NO. 253076/CABLE ADDRESS: BALFAN

INSTALLATION AND GENERAL GAME OPERATION INSTRUCTIONS

INSTALLATION

On all games there are certain items that should be checked after shipment. These are visual inspections which may avoid time consuming service work later. Minor troubles caused by abusive handling in shipment are unavoidable. Cable plugs and sockets may be loosened, switches (especially tilt switches) may go out of adjustment. Plumb bob tilt switch should always be adjusted after game is set on location and leg levelers are adjusted.

Visual inspections before plugging in line cord:

1. Check that all cable plugs are firmly seated in proper sockets.
2. Check that cables are clear of all moving parts and relays.
3. Check for any wires that may have become disconnected.
4. Check switches for loose solder or other foreign material that may have come loose in shipment and could cause shorting of contacts.
5. Check wires on relay coils for proper soldering especially the bare (common) wire connecting a row of relay coils. Cold solder connections may not show up in factory inspection, but vibration in shipment may break contact.
6. Check that fuses are firmly seated and making good contact.
7. Check (manually) the stepping and resetting of all step-up units. The wiper action should not be sluggish.
8. Check the transformer for any foreign material shorting across wiring lugs.
9. Check wiring of transformer to correspond to location voltage. (Transformer wiring card in front of cabinet).

Before line cord is plugged in - check all plugs and sockets and dress cables:

- (A) Plugs in correct sockets.
- (B) Plugs securely seated in sockets.
- (C) Dress cables away from relays.

Check adjustment of the (normally open) tilt switches:

- (A) Panel tilt on bottom of playfield panel.
- (B) Plumb bob tilt on left side of cabinet near front door.
- (C) Ball tilt above plumb bob tilt.
Insert the smaller ball (15/16" dia.) into the ball tilt assembly, and adjust the bracket so the ball will roll free to contact the switch blade, if front of cabinet is raised.

Plug in line cord:

Check adjustment of the (normally open) kick off switch on the cabinet mounting board. Check adjustment of the (normally open) anti-slam switch, on front door. If either of those switches is closed, the delay relay is energized momentarily.

General Game Operation

Place ball into playfield by outhole. Coin Game.

If coin should be rejected, move on-off master switch at bottom right front corner of cabinet to "on" position, then coin game. Coin lock out device rejects all coins when power (master switch) is off. Also check the delay relay. If this relay is energized, the game will not accept coins.

- 1A. If coin is inserted in first (nickel) coin chute and game is conditioned for 1 play - 5¢, it will energize the coin relay. If game is conditioned for 1 play - 10¢, the first coin inserted will advance the second coin unit, then second coin inserted will energize the coin relay thru the second coin unit switch. (see first coin chute adjustment plug positions on game adjustments sheet).
- 1B. If coin is inserted in second (dime) coin chute and game is conditioned for 1 play - 10¢, it will energize the coin relay. If game is conditioned for 2 play - 10¢, it will energize the second coin chute relay and second coin chute relay will advance the credit unit (2 steps) thru the credit circuit. (see second coin chute adjustment plug positions on game adjustments sheet).
- 1C. If coin is inserted in third (quarter) coin chute and game is conditioned for 2-3-4-5 or 6 plays - 25¢, it will energize the third coin chute relay and the third coin chute relay will advance the credit unit (2-3-4-5-6 steps) thru the credit circuit. (see third coin chute adjustment plug positions on game adjustment sheet).
- 1D. When the credit unit has been advanced from second or third coin chute, (as described in section 1B and 1C) the front door credit button switch, (when actuated) will energize the credit relay and then the credit relay will energize coin relay.

- 2A. The coin relay, when energized by any of the ways described, (sections 1A thru 1D) will stay energized thru its own hold-in switch and (normally closed) #8 score motor switch.
- 2B. The coin relay will energize the reset relay thru a game over relay switch, operate the score motor and then thru normally open #2 score motor switch, energize the score reset relay. The reset relay will operate the score motor. Both the reset and the score reset relay will be energized thru a normally closed #8 score motor switch, or until all score counter units are reset to zero position.
- 2C. The coin relay, thru a normally open #3 score motor switch will advance the total play meter, and thru the reset relay will reset the second coin relay ball count unit and game over relay. The coin relay will also reset the credit unit, (one step) when energized by the credit button.
- 3A. A ball on the outhole switch, at the start of game will energize the outhole relay thru a normally closed #1 score motor switch, and it will stay energized thru its own hold-in switch and a normally closed #8 score motor switch. For operations after the first ball, see under heading "Sequence of Operation".
- 3B. When the outhole relay is energized, it will operate the score motor and then energize the outhole kicker solenoid thru a normally open #7 score motor switch. The ball will be kicked thru the ball through to the shooter alley. The game is ready for the first player to play.
- 3C. To condition the game for second player, insert second coin or use the credit button before the first ball is played, this will trip the second coin relay but will not energize the reset relay, it will operate the score motor, advance the total play meter, subtract a credit from credit unit, (if credit button was used) and trip the second coin relay thru a normally open #3 score motor switch. The game is now set for 2 players.

SEQUENCE OF OPERATION

- 1A. When a ball is played, the ball index relay will be energized thru the 10 point, 100 point or 1,000 point score relay and it will stay energized thru its own hold in switch and normally closed #6 score motor switch and a normally closed outhole relay switch.
- 1B. When the ball goes into the outhole:
 - a. The bonus score relay is energized and operates the score motor to add the bonus score to the total score of the player. When the scoring is completed, this bonus score relay is de-energized and the outhole relay is energized. The outhole relay will remain energized thru its own lock-in switch until the normally closed #8 score motor cam switch opens.

- b. The outhole relay will advance the ball count unit thru #4 score motor cam switch, if 2 players are playing and no extra ball has been scored.
- c. The outhole relay will advance the ball count unit one step when 2 are playing. When one player plays, the ball count unit advances two steps for each ball played.
- d. The outhole relay when energized will operate the score motor and thru #7 score motor cam switch it will energize the outhole kicker solenoid which will eject the ball from the outhole to the shooter alley. The outhole relay thru another #6 score motor cam switch will advance the bonus unit from zero to 1,000 position. The outhole relay when energized will de-energize the ball index relay, the extra ball relay and the tilt relay.

Feature Operation and Scoring

A-B-C-D Sequence:

At the start of each ball, (3) "A", (3) "B", (3) "C" and (3) "D" object lites are lit. Hitting any of the (3) "A" lites, lites the "A" lite in the "A-B-C-D" sequence located in the center of the play-field. Hitting any of the (3) "B" lites, lites the "B" lite in the "A-B-C-D" sequence. Hitting any of the (3) "C" lites, lites the "C" lite in the "A-B-C-D" sequence. Hitting any of the (3) "D" lites, lites the "D" lite in the "A-B-C-D" sequence.

Double Bonus:

When the "A-B-C-D" sequence is completed the first time for a ball in play, the Double Bonus lite is awarded, and the (3) "A", (3) "B", (3) "C" and (3) "D" object lites become illuminated again.

Extra Ball:

When the "A-B-C-D" sequence is completed the second time for that same ball in play, the same player shoots again lite is awarded, giving that player an extra ball, and the (3) "A", (3) "B", (3) "C" and (3) "D" object lites become illuminated again.

Special:

When the "A-B-C-D" sequence is completed the third and each additional time for that same ball in play, a special is awarded. With the "High Score Feature Plug" in the liberal position (see plug chart) a replay is awarded. With the "High-Score Feature Plug" in the conservative position, 1,000 points are scored. Controlled by the "High-Score Feature Plug" are the (2) out lane special lites, as follows:

"High-Score Feature Plug" in liberal position - 1 replay awarded when lite is lit.

"High-Score Feature Plug" in conservative position - 1,000 points at all times, special lites never lighting.

Bonus Score Feature

A Bonus Score of 1,000 to 15,000 can be scored.

The game starts with a bonus score of 1,000. The bonus score advances one step at a time, each time, the playfield ball rolls over the top roll-over button when lit. The bonus advances each time the ball,

- (a) goes through any top lane,
- (b) over any of the roll-over buttons,
- (c) hitting either targets and,
- (d) through either of the return lanes, whether the "A-B-C-D" object lites are lit or not.

When the ball goes into the outhole, the lit bonus score is added to the player's total score; if the double bonus lite is lit, twice the lit bonus score is added to the player's total score. A tilt nullifies the bonus score.

Spinner Lites

At the start of each ball, with the 3-5 ball adjustment plug in the 5 ball per game position (see plug chart in game), each of (3) spinners score 10 points. After the first "A-B-C-D" sequence is completed, each of the (3) spinner lites lite and each spinner scores 100 points. With the 3-5 ball adjustment plug in the 3 ball per game position, the (3) spinner lites are always lit and each of the spinners score 100 points at all times.

Free Ball Gate Feature

The free ball gate is opened when the playfield ball hits the top center target when lit. The target lite is controlled by the target adjustment plug located on the panel. With the plug in the liberal position, the target lite remains on constantly; with the plug in the conservative position, the target lite alternates ON/OFF with each 10 points scored.

NOTE: This plug also controls the top roll-over button lite - liberal on all the time; conservative - alternates ON/OFF with 10 points. The gate remains open until a ball either, goes through and is returned to the ball shooter, into the outhole, or, the game is tilted.

GAME ADJUSTMENTS

Playfield Panel Post Adjustments:

Posts that control left and right outlane opening on panel (see panel sketch) can be moved to make access to outlanes easier or harder for ball to enter.

Easier entry will decrease playing time and scoring.

Harder entry will increase playing time and scoring.

Hi-Score Adjustment Plug:

Located on back box lite insert. This plug provides a wide range of coverage at which Hi-score credits can be scored. (see the score adjustment card in back box for plug positions).

Match Feature Adjustment Plug:

Located on front cabinet mounting board. This plug provides positions to operate match feature on or off.

Hi-Score Feature Adjustment Plug:

Located on front cabinet mounting board. This plug provides positions to award Hi-score credit or extra ball.

Balls Per Game Adjustment Plug:

Located on front cabinet mounting board. This plug provides positions to operate game on 5 ball or 3 ball play.

1st Coin Chute Adjustment Plug:

Located on the 2 coin unit, on front cabinet mounting board. This plug provides positions to give 1 play for 1 coin or 1 play for 2 coins thru the 1st (nickel) coin chute.

2nd Coin Chute Adjustment Plug:

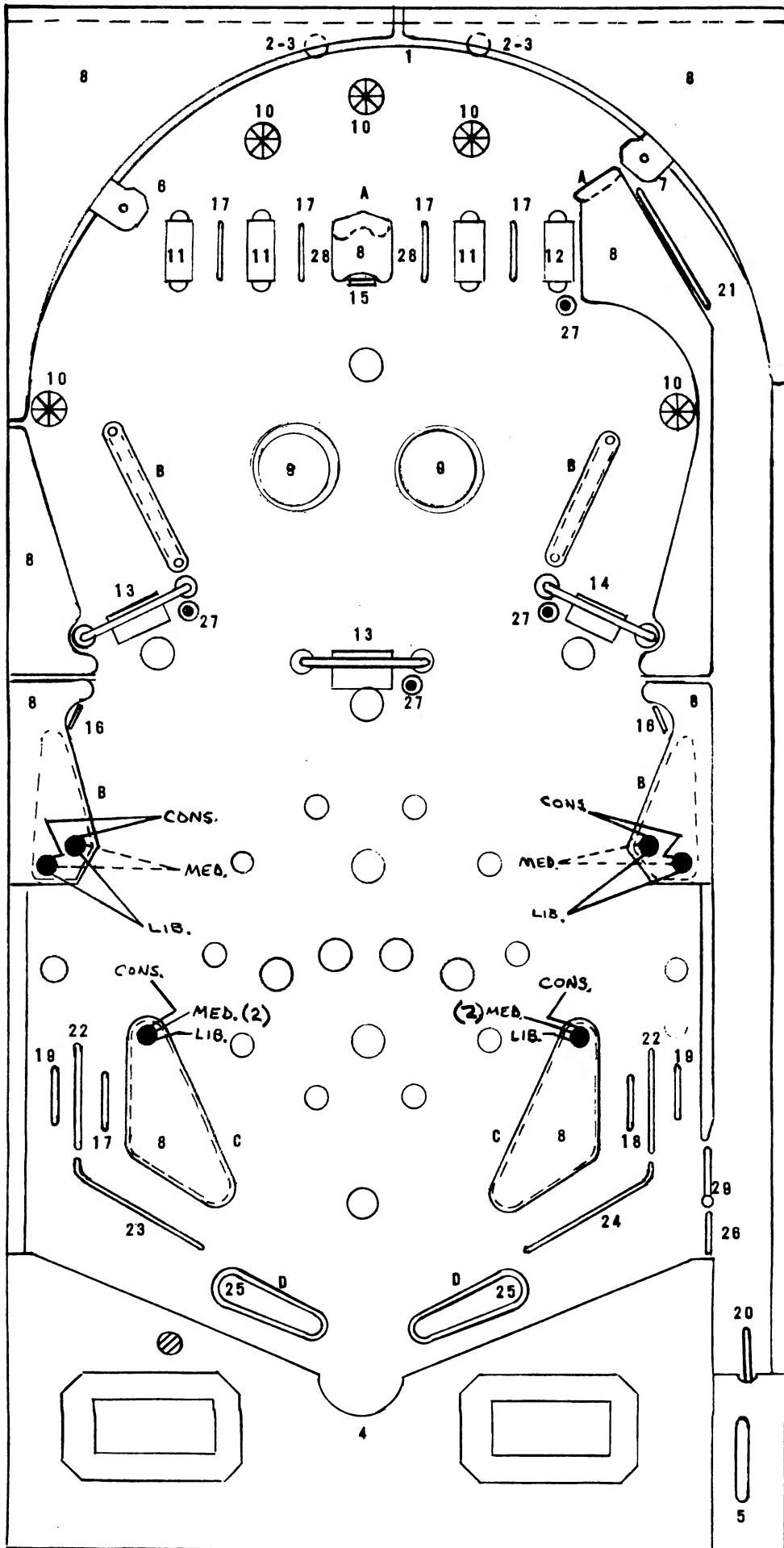
Located on front cabinet mounting board. This plug provides positions to give 1 play for 1 coin or 2 plays for 1 coin thru the 2nd (dime) coin chute. NOTE: When this plug is set for 2 plays - 1 coin, Brown-White (male plug) wire on 3rd coin chute adjustment must be in position 2.

3rd Coin Chute Adjustment Plug:

Located on front cabinet mounting board. This plug provides positions to give 2 to 6 plays for 1 coin thru the 3rd (quarter) coin chute. Use Orange-White (male plug) wire to set number of credits.

PARTS LIST

MISCELLANEOUS	PART NO.	ASSEMBLY COILS	PART NO.
Transformer	E-122-95	Coin Lockout	FC-33-2600
Score Motor (Domestic)	E-119-354	Chime 10,100 & 1000 Pts.	
Score Motor (Export)	E-119-411	(3)	CG-29-1600
Total Play Meter	E-32-1700	Knocker	AK-27-1300
		Slingshot Left/Right-2	AP-27-1300
		Flipper Left/Right-2	AF-25-500
			28-1000
<u>RELAY COILS</u>			
Alternator	G-32-2500	Thumper Bumper	AP-27-1300
Delay	G-30-1500	Outhole Kicker	A-25-850
Coin	G-31-2000		
2nd Coin Chute	G-31-2000	<u>UNIT COILS</u>	
3rd Coin Chute	G-31-2000		
Credit	G-31-2000	2 Coin (step up)	CD-29-1600
Lock	G-33-2800	Credit (step up)	B-26-1100
Reset	G-31-2000	Credit (reset)	C-28-1100
Score Reset	G-30-1500	Ball Count (step up)	B-26-1100
Game Over (Trip)	G-31-1600	Ball Count (reset)	C-28-1100
Game Over (Latch)	G-31-2000	00-90 (step up)	CD-29-1600
Bonus Score	G-31-2000	Score Drums (step up) (8)	CD-29-1600
Outhole	G-31-2000	Bonus Unit (step up)	B-26-1100
Ball Index	G-32-2500	Bonus Unit (reset)	C-28-1100
Tilt	G-32-2500		
Extra Ball	G-32-2500	<u>UNIT DISCS</u>	
10,100 & 1000 Pts. (3)	G-31-2000	Ball Count	W-1043-28
Double Bonus	G-32-2500	00-90	W-999-28
500	G-31-2000		W-999-29
"A", "B", "C", "D", (4)	G-32-2500	Bonus	W-1072-50
Gate	G-31-2000		
Over the top delay	G-31-1600	<u>UNIT WIPERS</u>	
A-B-C-D Series	G-31-2000	Ball Count	AS-1046-801
		00-90	A-1618-3
		Bonus	AS-1046-800



RUBBER PARTS

A	R-521-2	1-1/2 DIA.
B	R-521-4	2-1/2 DIA.
C	R-521-5	3" DIA.
D	R-406-3	FLIPPER RUBBER

PANEL TOP PARTS

1.	M-1774	ARCH RAIL
2.	C-807	RAIL POST
3.	C-808	RAIL POST CAP
4.	P-5871-50	BOTTOM ARCH
5.	P-8359-18	BALL SHOOTER GUIDE
6.	A-1475-10	BALL GATE (L)
7.	A-1475-8	BALL GATE (R)
8.	A-2880-114	SCREENED PLASTICS
9.	A-3713-22	THUMPER CAP
10.	C-800	ROLLOVER BUTTON
11.	C-693-1	PLASTIC GUIDE
12.	C-694-1	PLASTIC GUIDE
13.	AS-2250-38	SPINNER GATE
14.	AS-2250-39	SPINNER GATE
15.	AS-982-807	TARGET ASSEM.
16.	AS-982-752	TARGET ASSEM.
17.	AS-2808-1	ROLLOVER WIRE ASSEM.
18.	AS-2808	ROLLOVER WIRE ASSEM.
19.	AS-2808-2	ROLLOVER WIRE ASSEM.
20.	AS-2808- 23	ROLLOVER WIRE ASSEM.
21.	M-121-30	BALL GUIDE
22.	M-121-18	BALL GUIDE
23.	M-121-43	BALL GUIDE
24.	M-121-44	BALL GUIDE
25.	AS-2214-24	FLIPPER & SHAFT
26.	M-121-46	BALL GUIDE
27.	AS-2838	MINIPOST & BUMPER
28.	C-694-5	PLASTIC GUIDES (2) (WHITE)
29.	M-1335-1	GATE WIRE

● INDICATES MOVABLE POSTS FOR

ADJUSTMENT:

CONS. - - -

MED. --- (2 MED.
LIB. --- S.S. ONLY)

A) Schematics

The schematic as drawn shows the power-off condition. The lock relay is de-energized. The lock relay will become energized when the power is turned on. The general illumination lights will now light. The schematic should be used to localize the area of interest for any given fault. For example, if the game were coined and the credit button pressed, the game over relay should be latched. If not, the trouble could be in the motor switches or the lock relay. Visual inspection will usually reveal the source of the trouble. A volt-ohmmeter will always locate the trouble.

The schematic, therefore, allows us to trace each circuit through the game to the power source (the transformer secondary). A color code is given for each lead to facilitate this tracing in the game.

The numbers on the bottom of the schematic and the letters on the left hand margin of the schematic can be used with the coil location chart at the right hand side to locate relays and solenoids. If the coil number is not recognizable in the game, the schematic will give the number for reordering (for example, reset relay G-31-2000). The nominal resistance of each relay coil is also given.

Score motor operation is detailed on the schematic. The score motor is used in the coining, reset and scoring operations. The sequence of operation table indicates that the score motor, when energized, will actuate contacts associated with cams one through twelve in the positions indicated. Cam #1 is physically closest to the motor. Cam switches are lettered alphabetically starting with "A" for the bottom of a switch stack. For example, the switch 2C, SCM, on the schematic is driven by the cam in the second position from the motor and is physically the third switch assembly above the cam in the switch stack. It is actuated by the score motor driven second cam in positions 1, 2, 3, 4 and 5.

The motor receives a starting pulse from various sources. It will index itself one-half revolution (180°) by means of self holding switch associated with Cam #1.

Relays shown on the schematic are shown de-energized. A relay consists of a coil of wire (electromagnet, when energized) armature or heel plate, plastic switch actuator, switch assemblies and frame. When the coil is energized, the armature is pulled to the coil by the electromagnetic force created by the current flowing through the turns of the coil. The plastic switch actuator is connected to the armature. The moving armature pulls the actuator and the long switch blades to the energized position. Contacts that were closed in the de-energized are opened in the energized position and vice-versa. In general, Bally relays are designed to self-hold or remain energized through a contact in the stack after the source of initial energization is removed.

B. ASSEMBLY ADJUSTMENTS

1. General

All switch assemblies consist of leaf springs, contacts, separators, plastic tubing and screws to hold them to the mounting surface on the relay frame. Before attempting to adjust a switch assembly, make sure that these screws are tight. If not, tighten screw closest to the contact end of the leaf spring first. This will prevent the assembly from being secured in such a manner that the leaf springs tend to fan out. In general, all leaf springs are adjusted for a $1/32"$ gap in the open position and $.010"$ overtravel or wipe in the closed position. All contacts should be in good condition. Unless otherwise instructed, they should be dry or non-lubricated. All contacts should be free of dust and dirt. Trinish can be removed with a contact file followed by a burnishing tool. Severely pitted contacts must be replaced as an assembly. In general, contacts need be cleaned or replaced and adjusted when they are found to be a source of game malfunction.

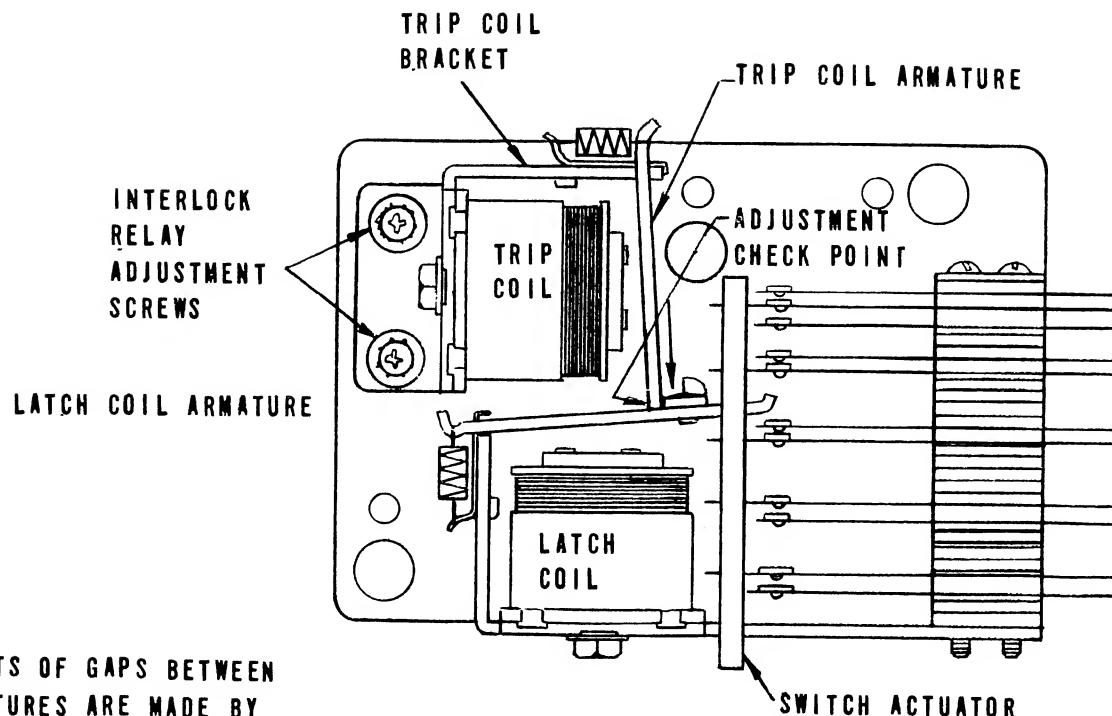
2. Relays

All of the above applies. Relay contacts are operated dry. Beyond the normal $1/32"$ gap adjustment, relays with a self-holding circuit must be adjusted such that the self-holding contacts make just before the other contacts (adjust to $.025"$ gap). Care in making this adjustment prevents false crediting and false scoring during the game.

The game-over relay is an example of an interlock relay. Interlock relays are adjusted for a $.010"$ gap between the trip and latch coil armatures in the trip position and a $.010"$ gap between the nylon on the latch coil armature and the trip coil armature in the latch position. If an adjustment is necessary, the interlock relay adjustment screws should be loosened and the trip coil repositioned until the trip and latch armature gaps are proper. The screws are then secured. Always check the switch adjustments after a gap adjustment is made. Open contacts should have a $1/32"$ gap. Closed must show $.010"$ overtravel.

FIGURE III - 2 INTERLOCK RELAY ADJUSTMENTS

BALLY INTERLOCK RELAY



ADJUSTMENTS OF GAPS BETWEEN THE TWO ARMATURES ARE MADE BY LOOSENING THE INTERLOCK RELAY ADJUSTMENT SCREWS. BE SURE TO TIGHTEN DOWN THE SCREWS AFTER ADJUSTMENT IS MADE.

ALWAYS CHECK SWITCH ADJUSTMENTS WHENEVER A GAP ADJUSTMENT IS MADE.

WHEN THE LATCH ARMATURE IS HELD DOWN DIRECTLY OVER THE CENTER OF THE LATCH COIL, THERE SHOULD BE A .010 GAP BETWEEN THE TRIP COIL ARMATURE AND THE NYLON PIECE OF THE LATCH COIL ARMATURE AT THE ADJUSTMENT POINT.

WHEN THE TRIP COIL ARMATURE IS HELD DOWN AND THE LATCH ARMATURE IS RELEASED, THERE SHOULD BE A GAP OF ABOUT .010 BETWEEN THE TWO ARMATURES.

3. Printed Circuit and Riveted Disc Units

Examples of these are the bonus, the player up, the ball count, the coin and the 00-90 units. The force exerted on the disc contacts by the rotor requires lubrication of the disc contacts. Periodic maintenance must include an inspection for the presence of lubrication and for contact condition. Touching the contacts with the fingers should result in a shiny trace on the finger. This, and absence of contact pitting and dirt indicate a satisfactory operating condition. Contact pitting can be corrected with a contact file and burnishing tool. Dirt should be removed with a clean, lint free cloth. If contact cleaning fluids are used to remove greasy dirt, a cloth must be used to remove any chemical residue. Finally, apply Bally coin machine lubricant to a clean cloth. Apply a thin film to the contact surfaces.

If, in trouble shooting, a rotor blade is suspected as the source of the problem, it can be checked for proper adjustment. A blade exerting too little pressure can be intermittent. A blade exerting too much pressure may slow or stop the rotor. A check for the force exerted by the rotors can be made as follows: gently warp the disc or printed circuit board away from the rotor. The rotor blade should follow the disc or board for 1/32" before contact is broken. If it follows further, contact force is too great. If it breaks contact too soon, contact force is not great enough. Use a contact adjusting tool to adjust the rotor blade pressure.

4. Credit Unit

- . The credit unit is used to store in memory the number of credits or games due a player. Credits are payed for or won for high score, match feature or as a special game feature. Improper adjustment of the credit unit can result in too many or too few credits issued to the player. To check for proper adjustment of the credit unit: (See Figure III-3)
 - a) Slowly hand actuate the step-up plunger. The step-up arm must not engage the next tooth on the ratchet (occasional engagement is acceptable). If the step-up arm does, gently bend the base plate tab down (away from the step-up solenoid) until hand actuation does not cause consistent engagement of the next tooth on the ratchet. This adjustment, properly made, prevents multiple crediting when only one credit is due the player.

CREDIT (REPLAY) UNIT

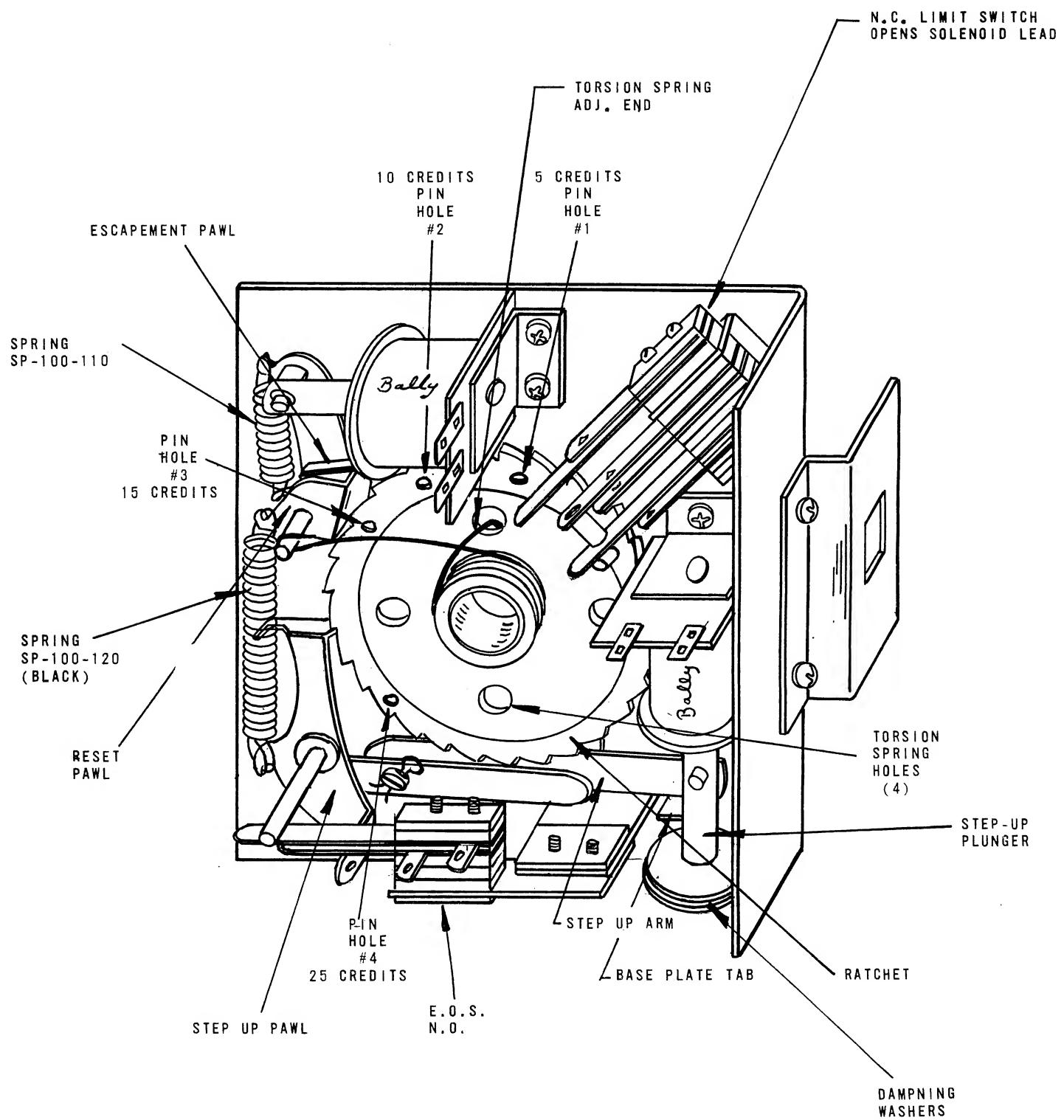


FIGURE III - 3 CREDIT UNIT ADJUSTMENTS

b) If multiple crediting persists, increase spring tension by moving the ratchet torsion spring (short end) one hole or 1/4 turn clockwise to the next hole. This will slow the ratchet wheel and decrease the probability of multiple crediting.

c) If the credit unit does not return to zero, check the adjustment of the switch stack just above the step-up solenoid. If the force exerted by the blades in this stack is excessive, the credit unit will not return to zero. Adjust the stack for a 1/32" gap when the credit wheel is not on zero, and a .010" overtravel at zero. Now spin the credit wheel by hand for the maximum allowable number of credit. The normally closed switch in the stack must now be opened by the pin in the ratchet wheel. This switch is the limit switch and opens the lead to the step up solenoid.

d) If two or more credits are subtracted each time the credit button is actuated, the spring (SP-100-110) that positions the escapement pawl is too strong. Gently spread the turns on the spring until the proper action is obtained.

It is to be noted that selection of the #1, 2, 3, or 4 pin hole will limit the maximum number of credits possible to 5, 10, 15 or 25, as desired. This pin actuates the limit switch on the switch stack.

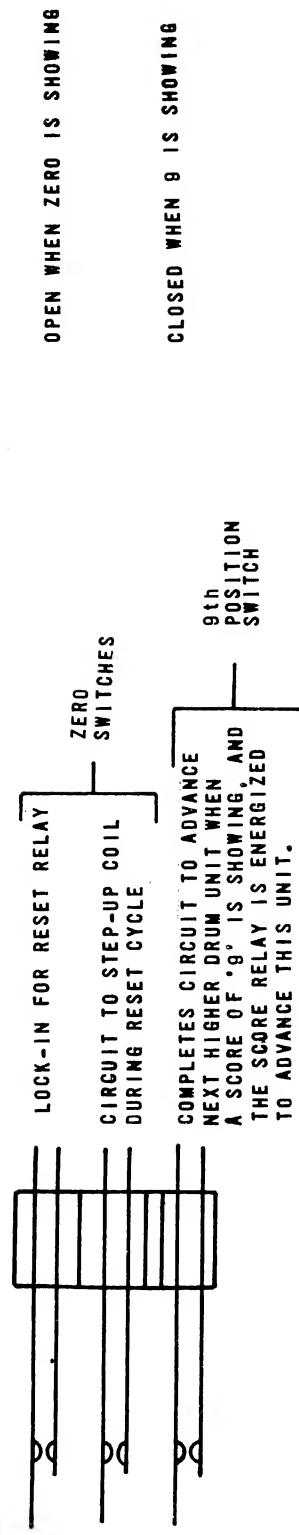
5. Score Drum Unit Adjustment (See Figure III-4)

All sixteen score drum unit assemblies are essentially the same. End of stroke switches are adjusted for a 1/32" gap and .010" overtravel (wipe) at the end of the solenoid stroke. The switches in the stack are adjusted likewise. Note that if the solenoid plunger is actuated by hand, all switches are open in the zero position, i.e., the numeral '0' in the viewing window on the insert. Malfunctions can be corrected by proper adjustment. Typical malfunctions are:

- Score drum continues to step through zero during the reset cycle (top switch in switch assembly always closed).
- Score drum does not score (second switch in switch assembly always open).
- Score drum and next higher drum advance simultaneously on a continuous or intermittent basis. This is proper when advancing from the 9th position to zero. For all other numerical positions it indicates that the last switch (closest to the metal frame) is always or intermittently closed.

SCORE DRUM UNITS SWITCHES

10-80, 100-900 & 1,000-9,000 UNITS (ALSO 10,000-90,000 UNIT WHEN 100,000 RELAY IS INVOLVED)



10,000-90,000 UNIT (EXCEPT IN GAME HAVING 100,000 RELAYS - SEE ABOVE)

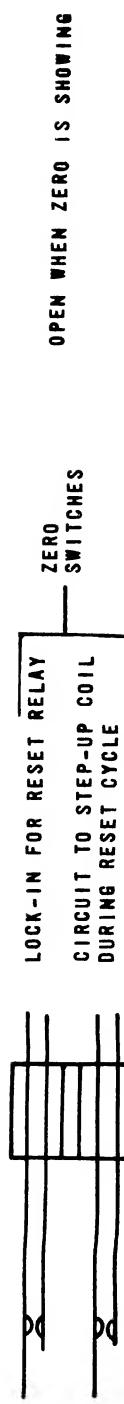


FIGURE III-4 SCORE DRUM UNIT SWITCH ASSEMBLY

Score drums are easy to trouble shoot. A faulty unit can be found visually. Visual inspection and adjustment is adequate to correct the problem. Do not overlook cable dress as a source of the problem. Dress bare leads away from adjacent connections.

SECTION IV SERVICE PARTS

A parts catalogue is available upon request. The catalogue is illustrated and lists all replacement parts for each game manufactured by Bally. Requests should be addressed to :

BALLY MANUFACTURING CORPORATION
2640 WEST BELMONT AVENUE
CHICAGO, ILLINOIS 60618
ATTENTION: PARTS DEPARTMENT

Enclose \$1.00 for postage and handling.

SERVICE HINTS

To maintain trouble free operation, all stepping unit contact plates, rivet and printed circuit type should be cleaned and lubricated sparingly every 30 days using Bally coin machine lubricant.

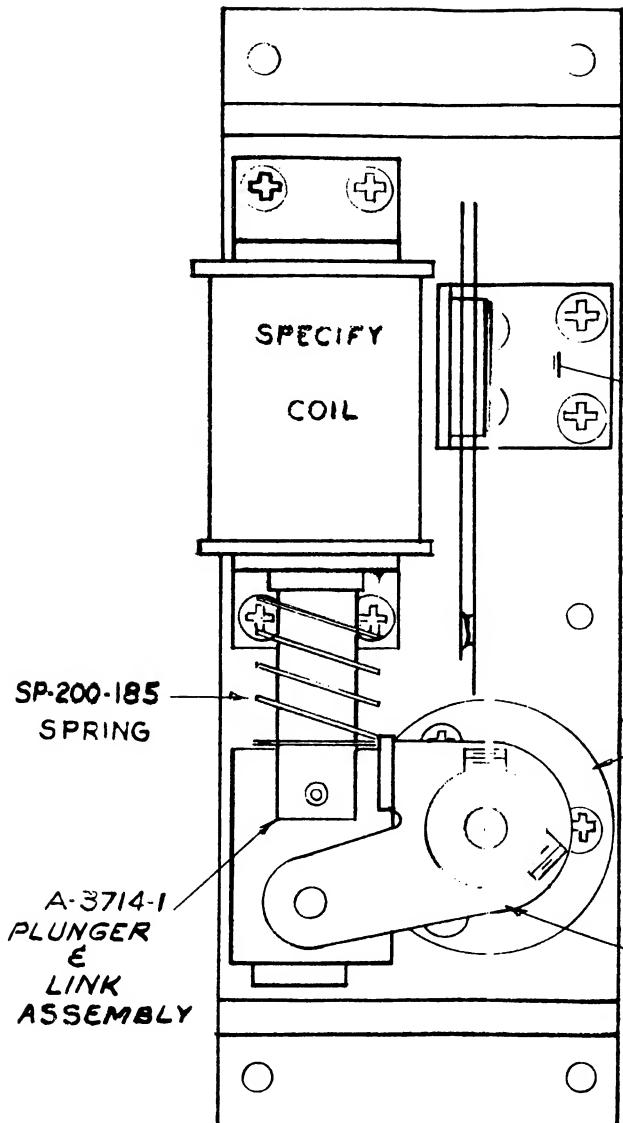
The Bally playfield has an improved tuff-coat finish with excellent wearing properties. It's life expectancy, as well as play appeal, can be extended by periodic cleaning of the playfield.

DO: Consult your local distributor for his product recommendations on this subject. Chances are, he has direct experience based on usage. If not, clean with a mild face type soap and a clean cloth dampened with water or clean with a product manufactured specifically for this purpose. Petroleum disillate based cleaners do not harm the playfield finish. Polish, if desired. A combination cleaner and polish such as Wildcat #125* (Wildcat Chemical Co., 1333 W. Siminary Dr., Ft. Worth, Texas 76115) or simply a cleaner such as Waterless Lemonite Cleaner* (Graco Sales Co., Rebel Labs, 8152 Highway 70, Arlington, Tenn. 38002) cleans even the dirtiest of playfields with ease. Use all cleaning agents sparingly. An accumulation of residue can jam roll-over buttons. Inspect and hand polish the ball in a clean cloth. A chipped ball must be replaced. It can ruin the finish on the playfield in a short period of time.

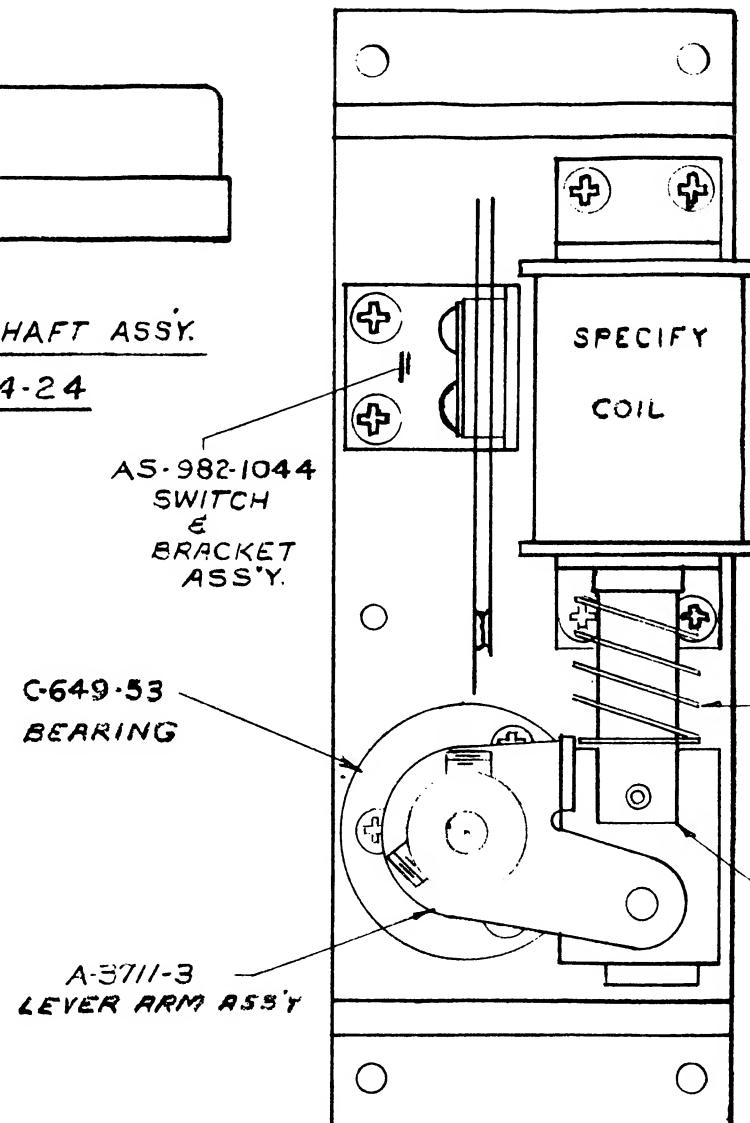
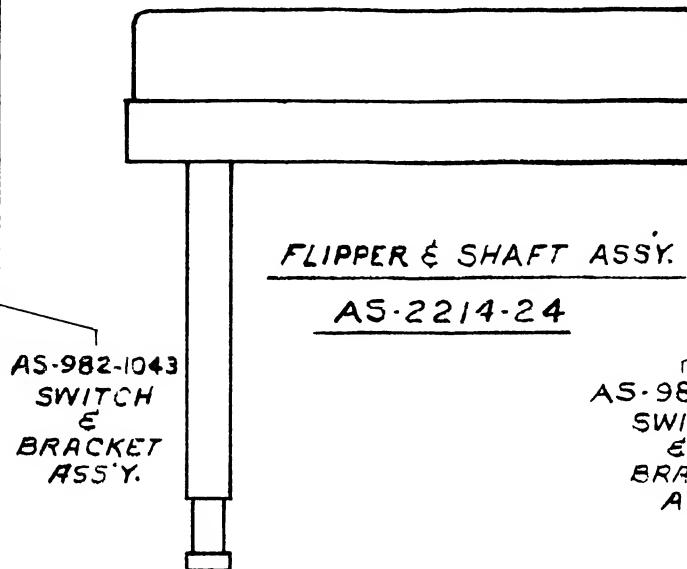
DON'T: Use water in large quantities, highly caustic cleaners, abrasive cleaners or cleaning pads on the playfield. Do not allow a wax or polish build up. Waxes yellow with age and spoil play appeal.

* Bally has tried these products and found them effective. Bally assumes no responsibility for their use, however, as Bally has no control over the manufacturers and any product changes they may make.

NEW BALLY FLIPPER UNITS



FLIPPER UNIT
LEFT SIDE

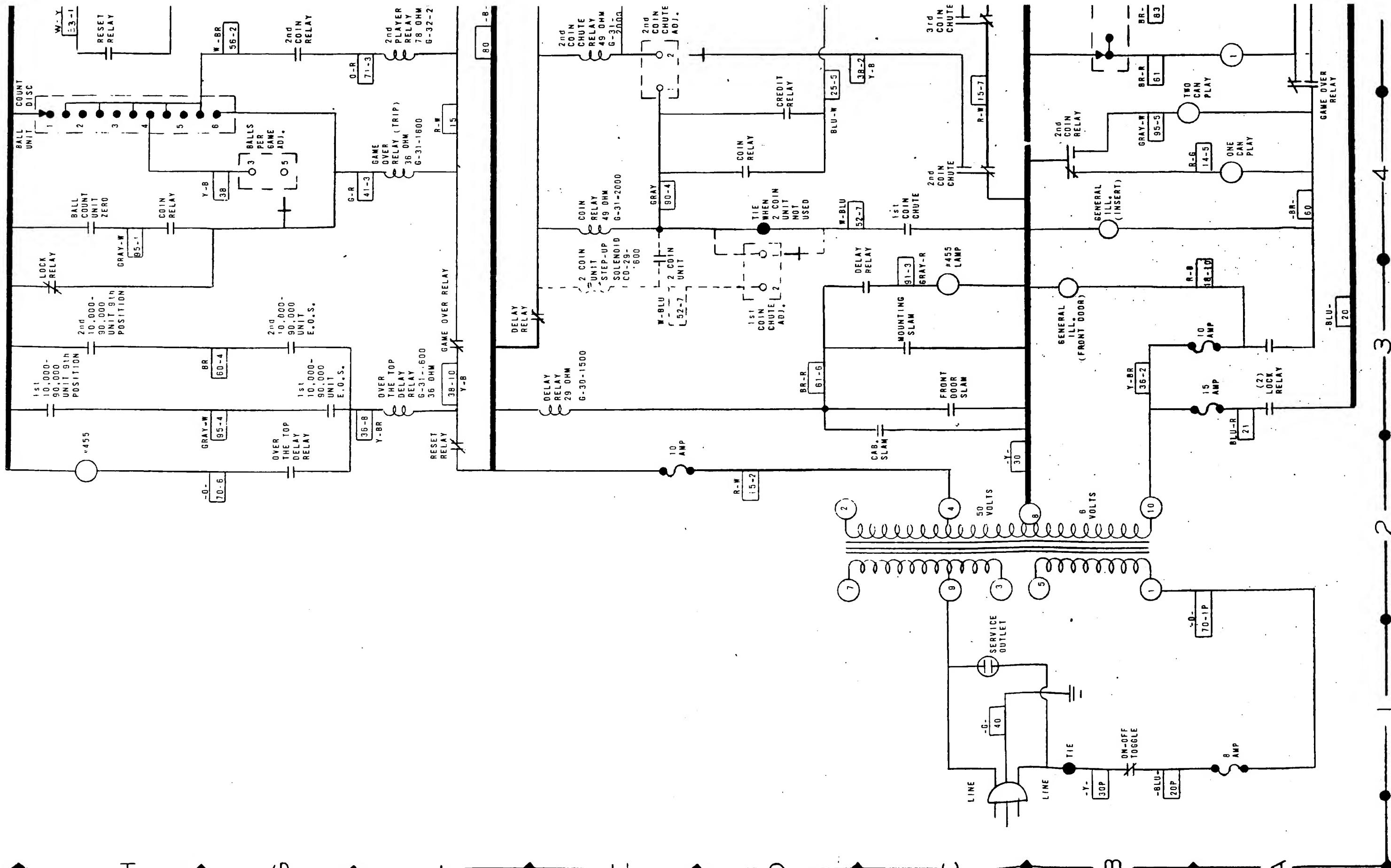


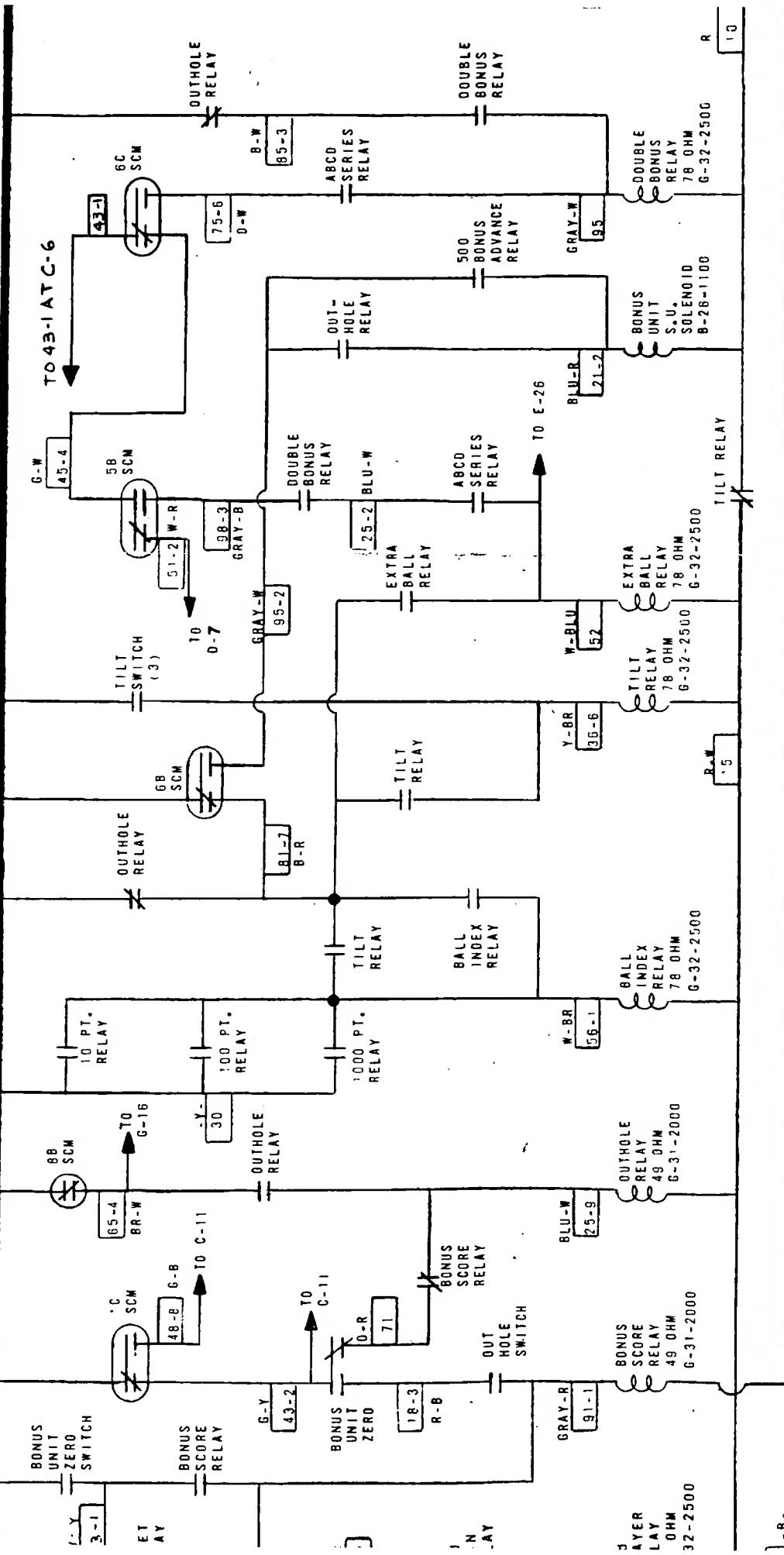
FLIPPER UNIT
RIGHT SIDE

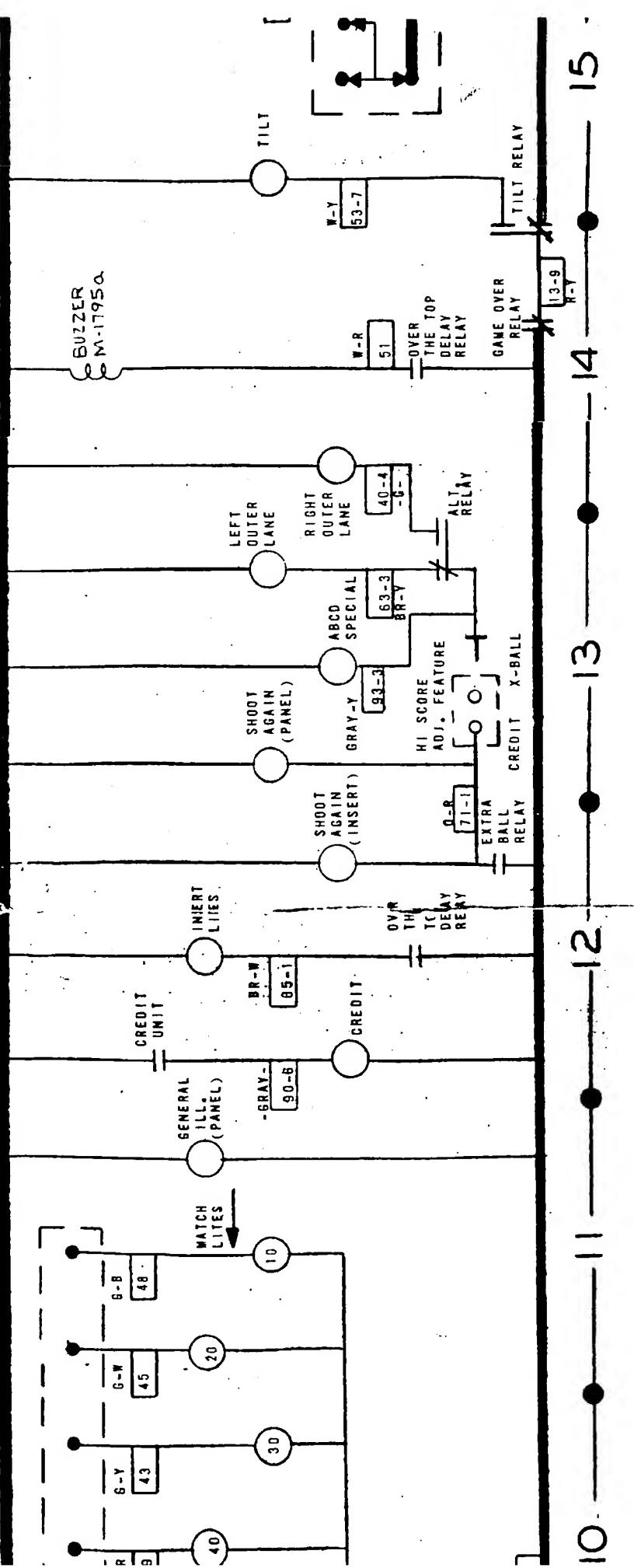
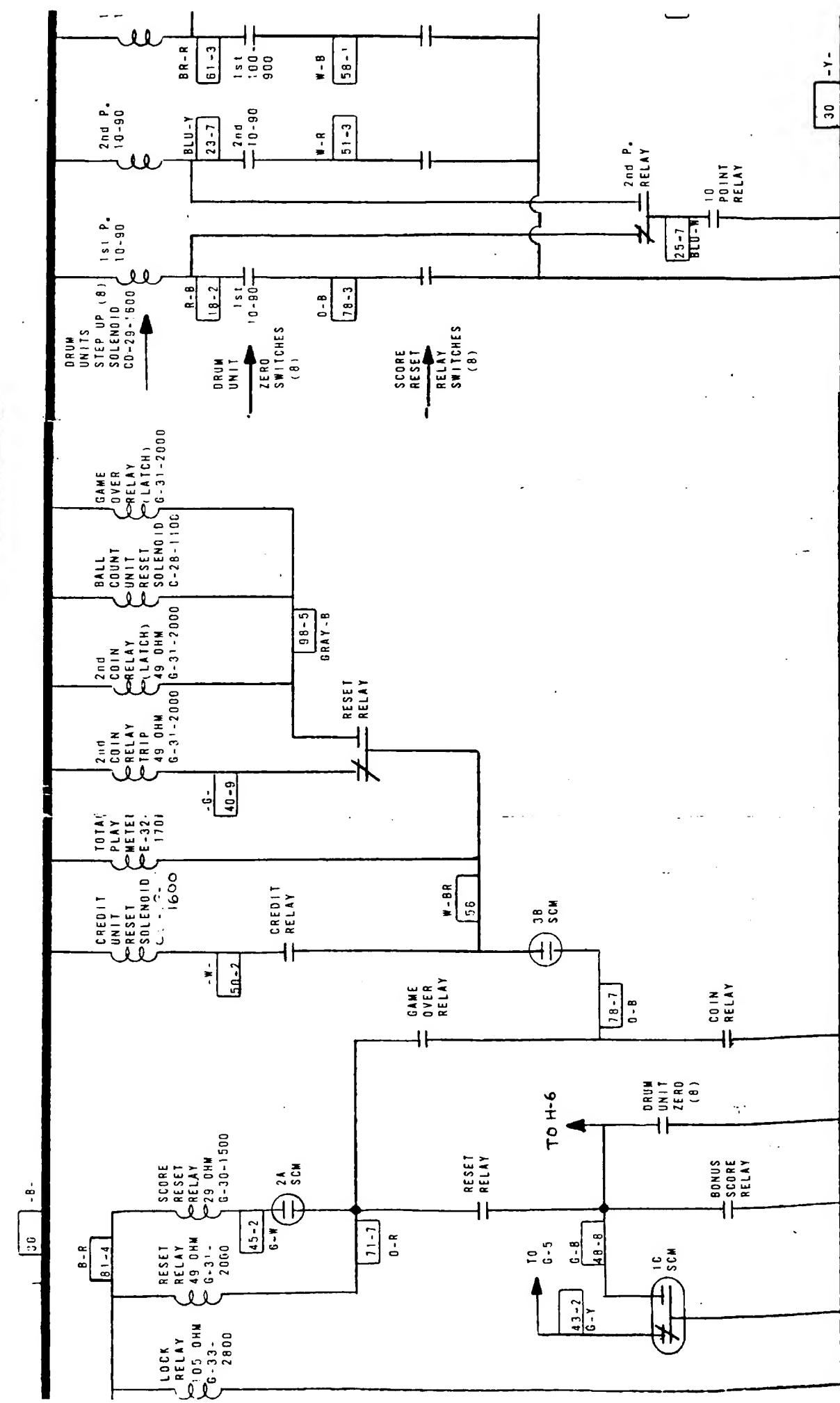
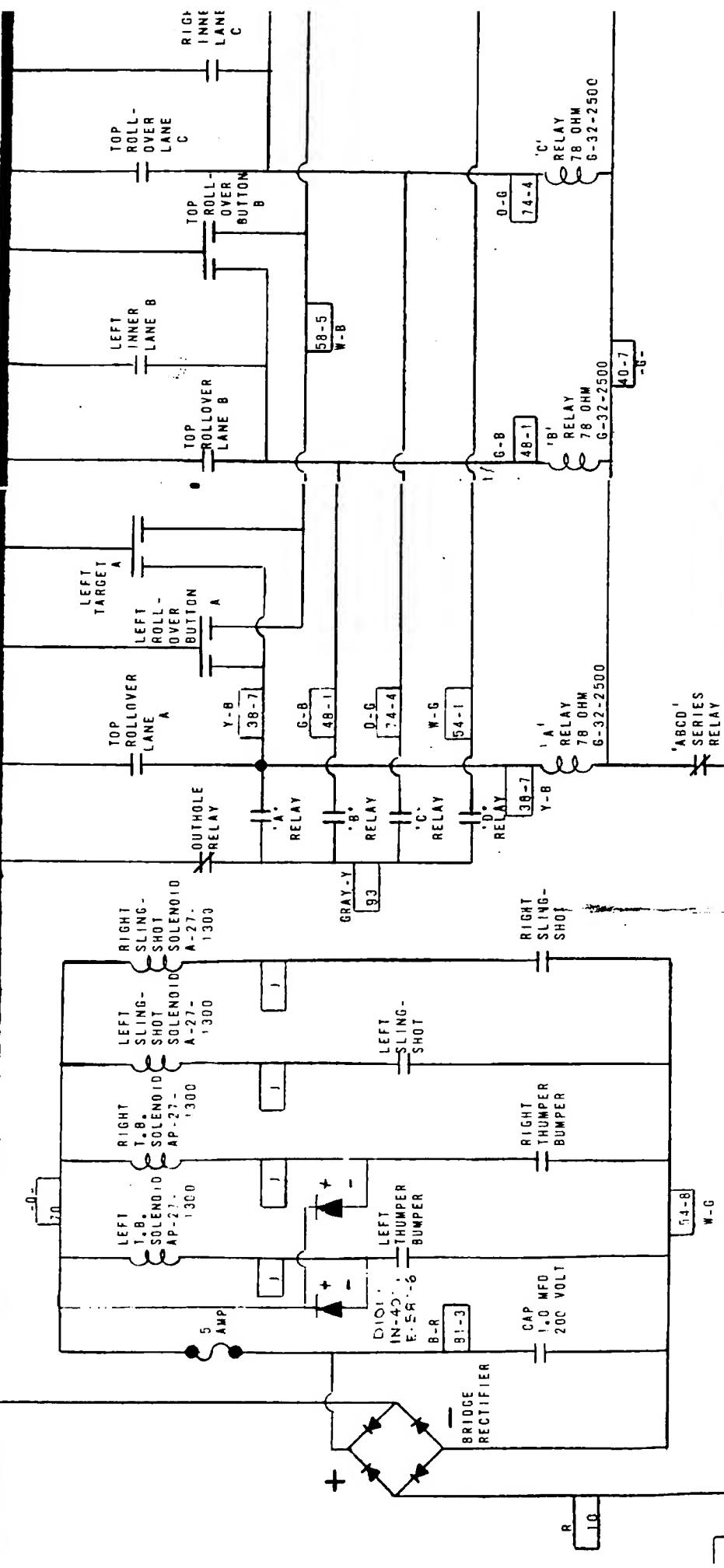
TIME DELAY CIRCUIT

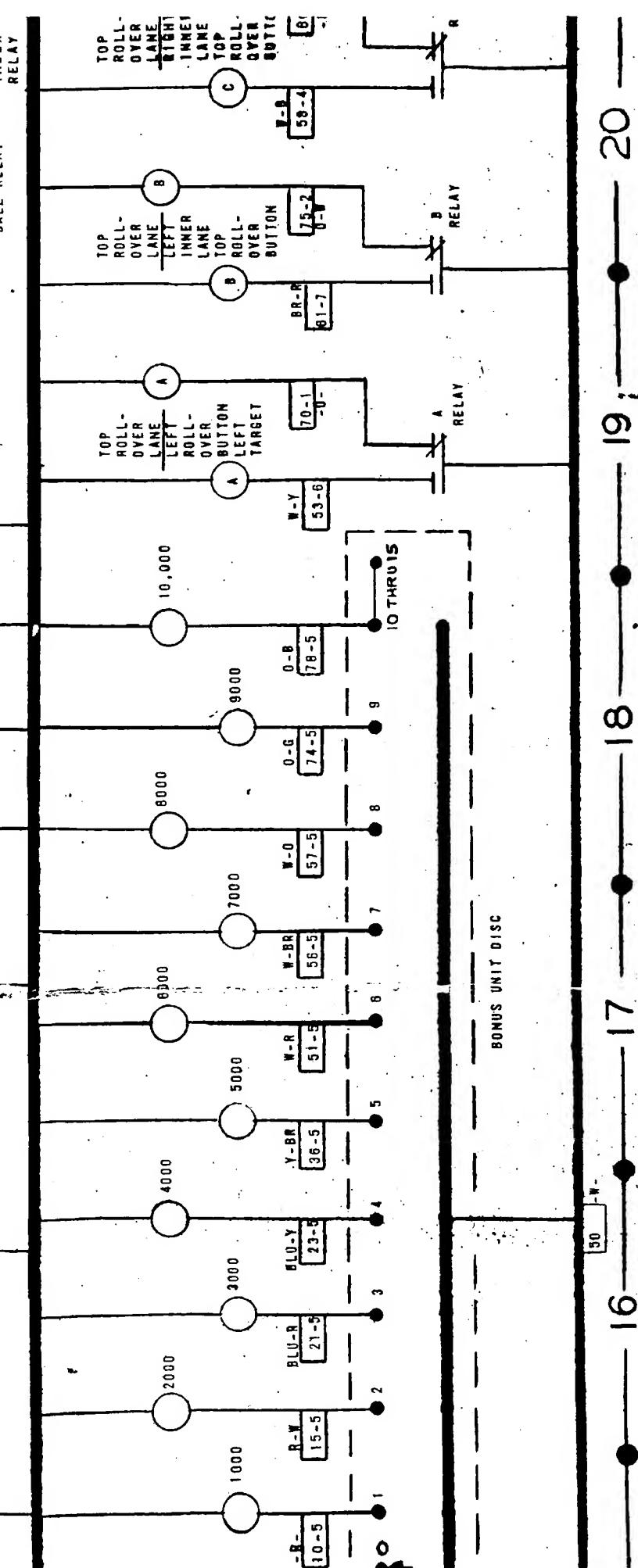
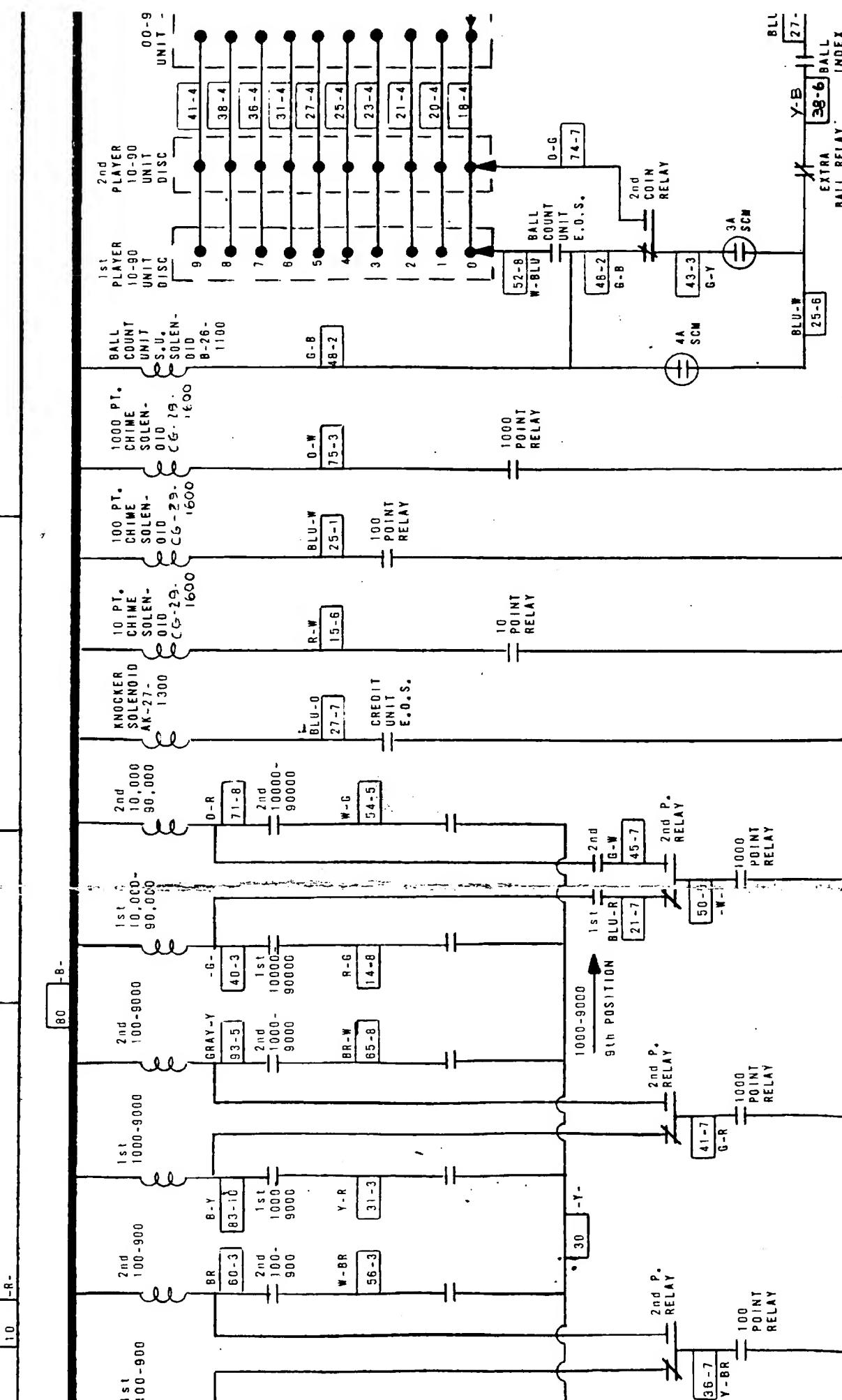
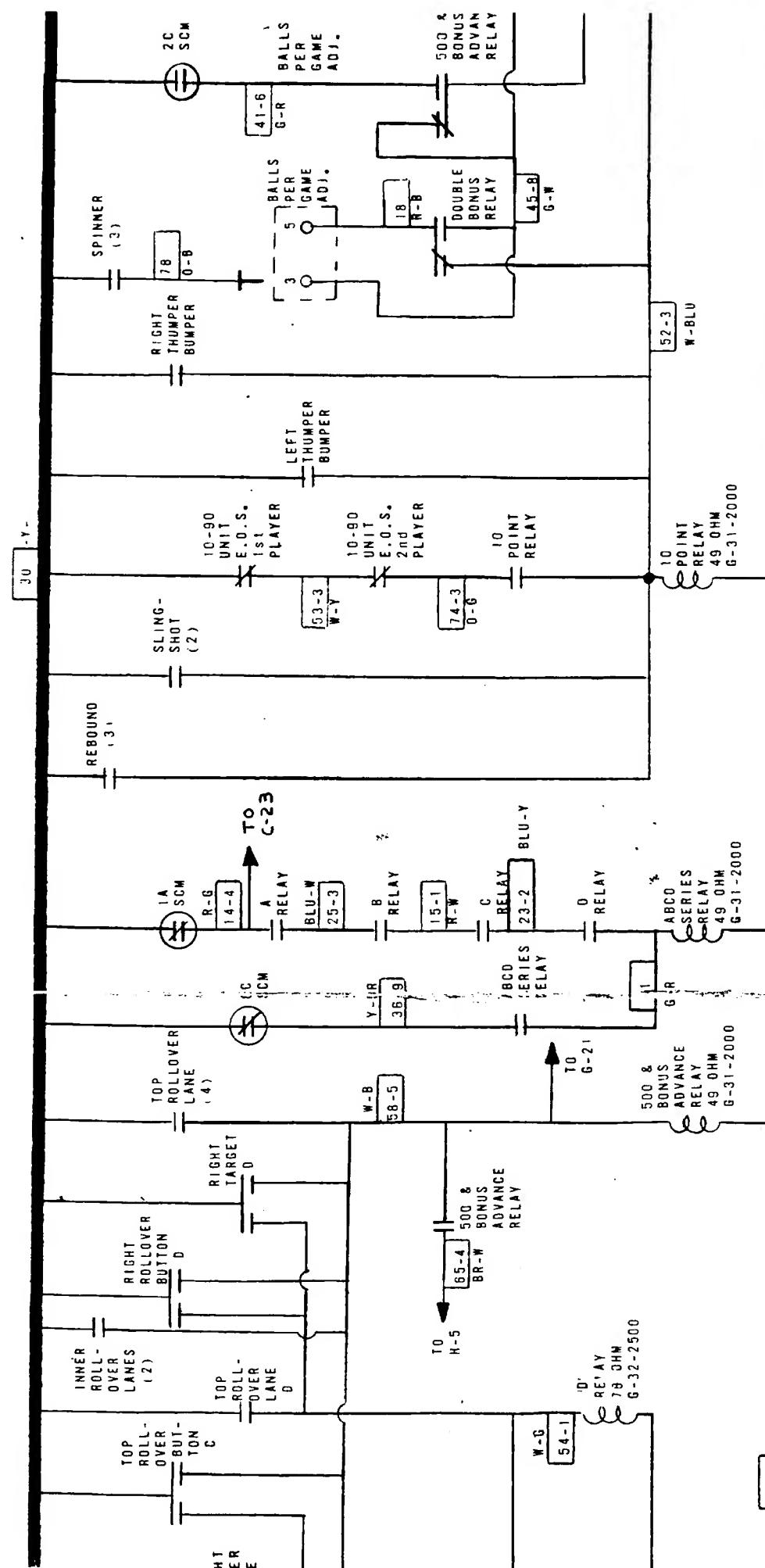
Purpose of the time delay circuit is to prevent unnecessary abuse of the machine it is installed in.

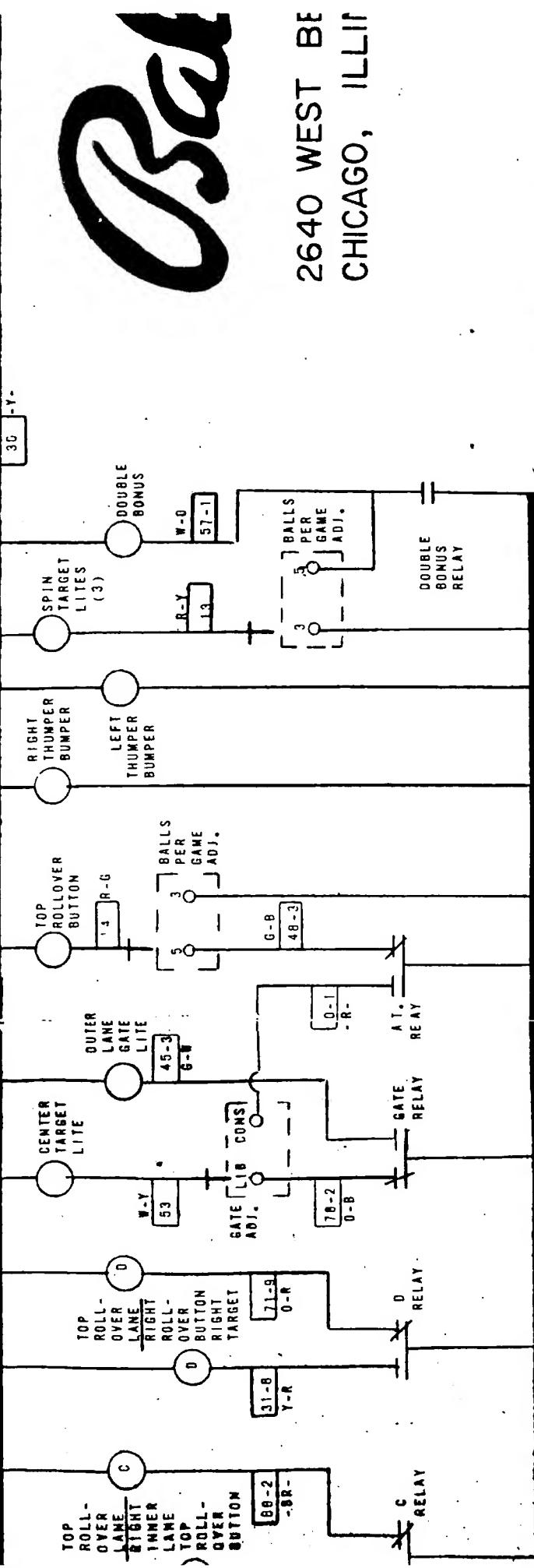
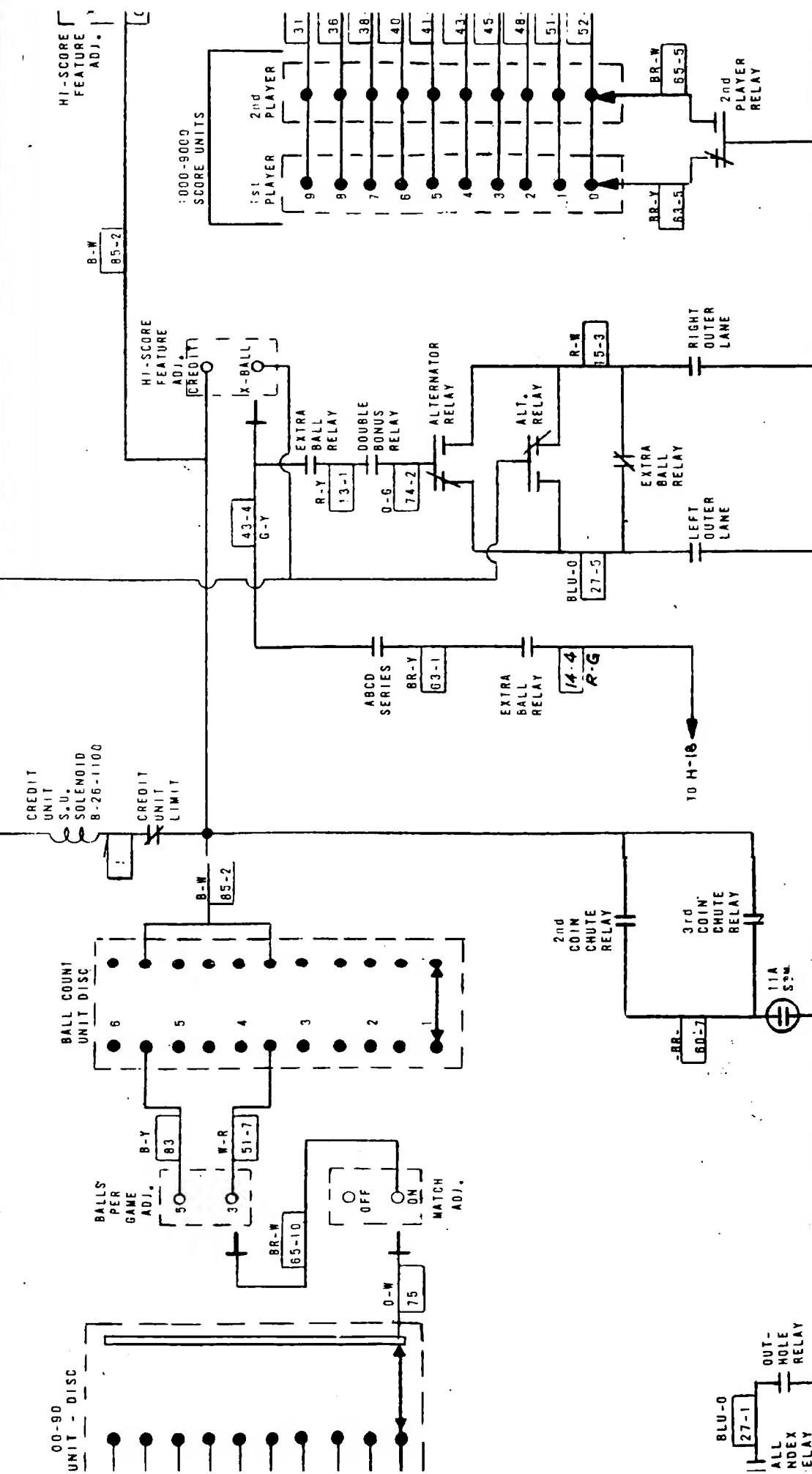
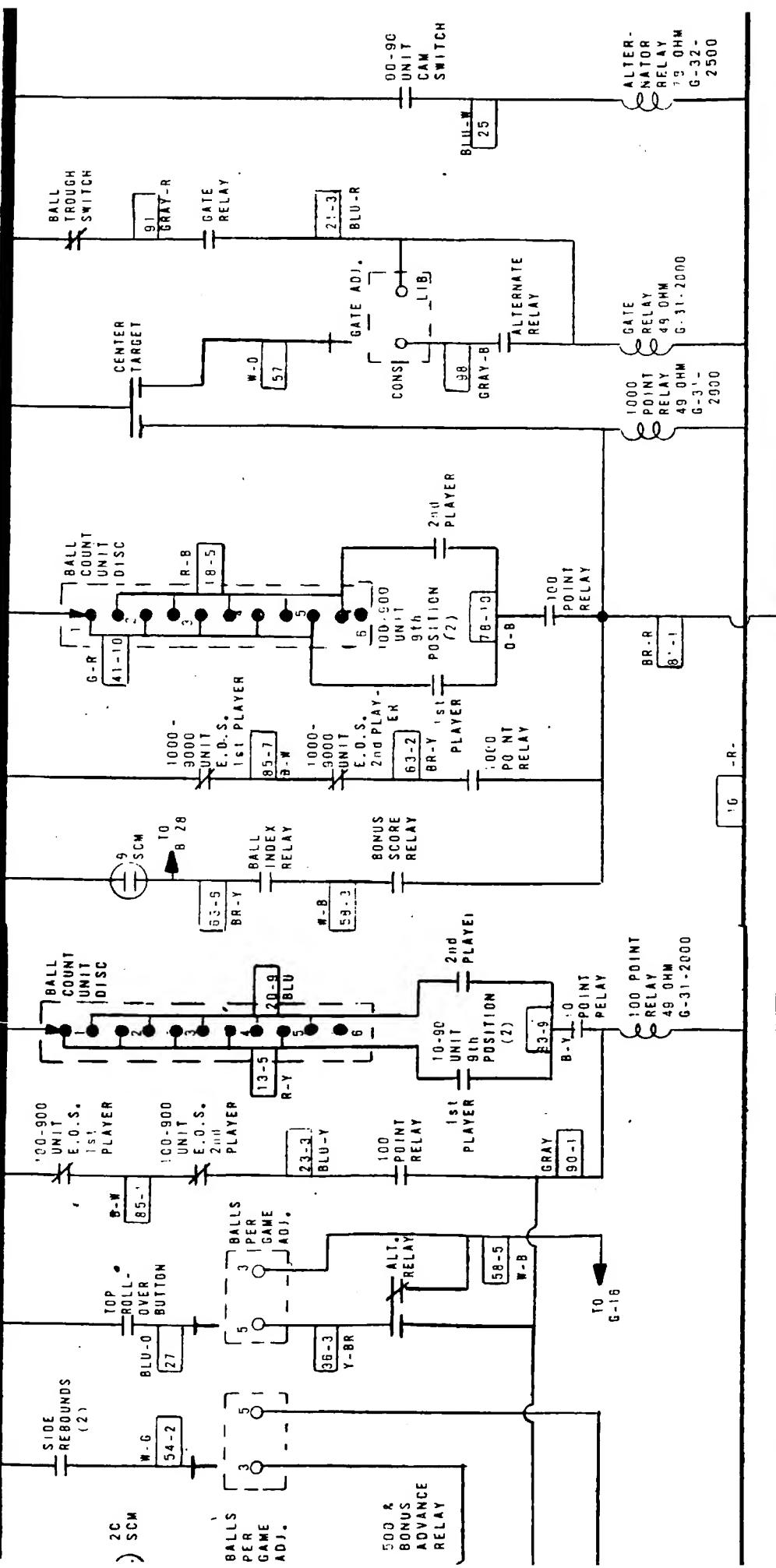
The time delay relay is energized anytime one of the slam switches are made to contact. There are two factory installed slam switches, one on the front door and one on the mechanism mounting board. (Any number of slam switches could be installed by the operator, to meet his individual requirement). The switches should be adjusted to have approximately 1/16" gap between the contacts. The weighted blade should be adjusted to attain the desired sensitivity. Decreasing the gap between contacts will make switch more sensitive. Opening the gap will reduce sensitivity. The total time the delay relay is energized can be varied by changing the #455 lite bulb mounted on the delay relay frame. If unable to get a short enough time of delay, get a Westinghouse #455 bulb; these units are considerable faster. If still unable to bring the time down, check the location voltage. It should not be under 49.5 V.A.C. on the transformer secondary.





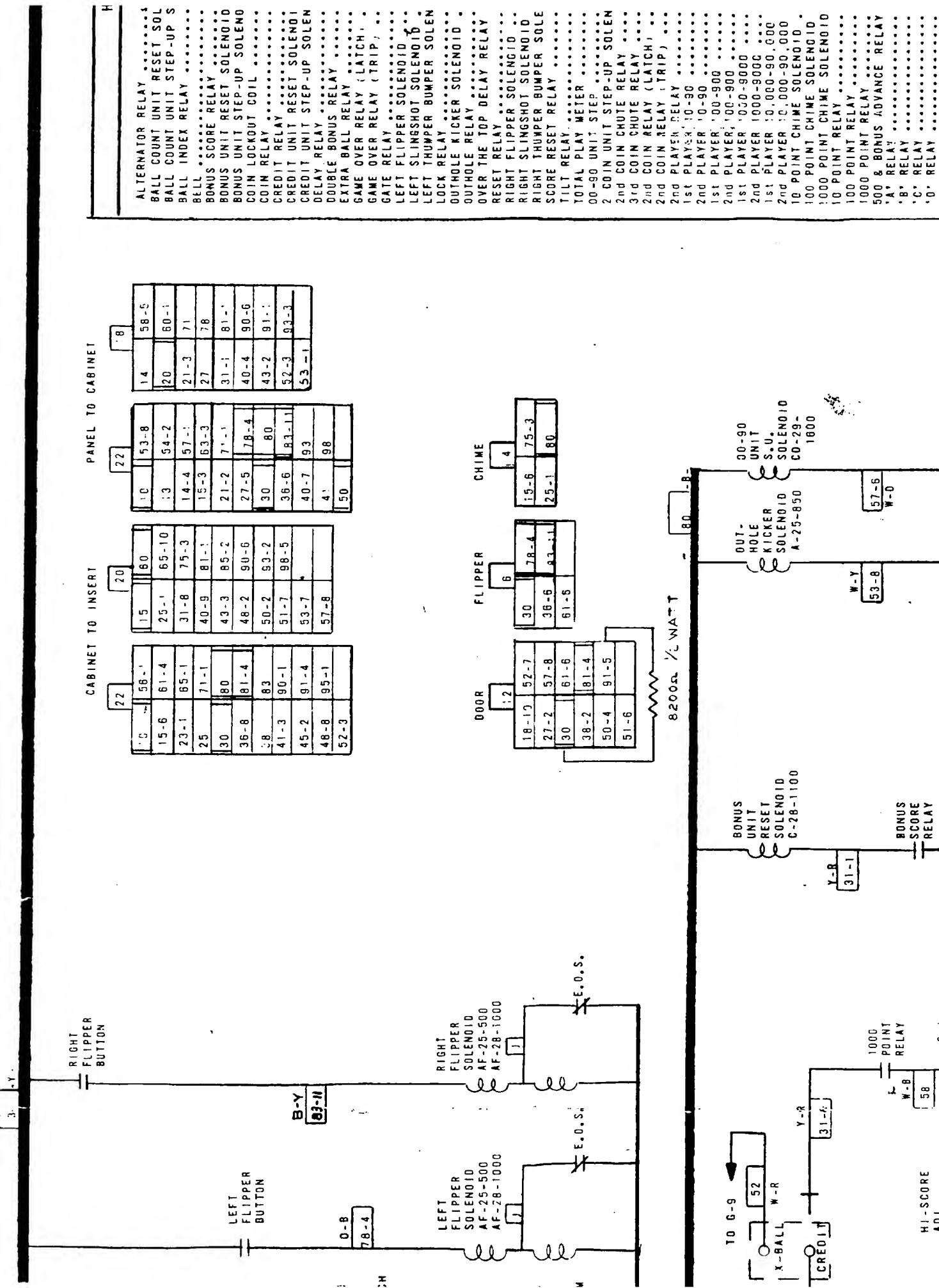






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CHICAGO, ILLINOIS

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HOKUS POKUS

ALTERNATOR RELAY	F-26
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CREDIT UNIT STEP-UP SOLENOID	E-27
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2nd PLAYER 100-900	E-16
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2nd PLAYER 1000-9000	F-5
1st PLAYER 10-90	E-15
2nd PLAYER 10-90	E-15
1st PLAYER 100-900	E-16
2nd PLAYER 100-900	E-16
1st COIN RELAY (LAUNCH)	E-12
2nd COIN RELAY (TRIP)	E-13
2nd PLAYER RELAY	F-5
1st PLAYER 10-90	E-15
2nd PLAYER 10-90	E-15
1st PLAYER 100-900	E-16
2nd PLAYER 100-900	E-16
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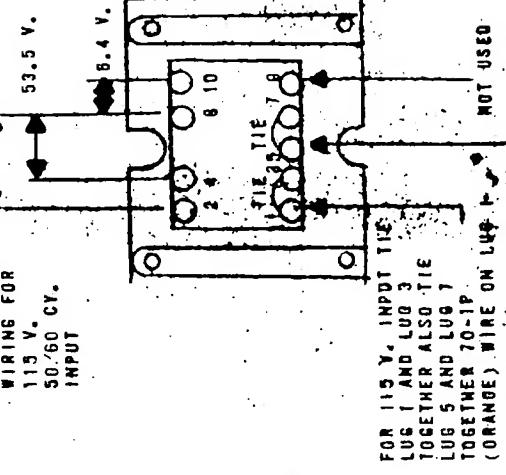
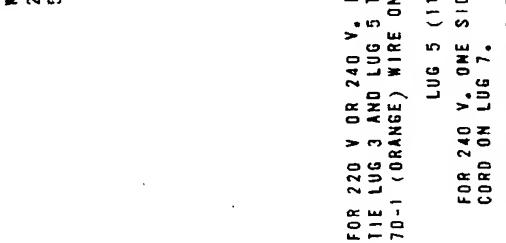
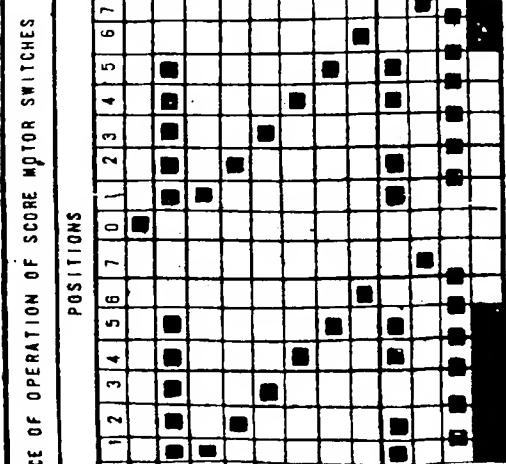
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